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ABSTRACT

The job analysis procedures used in the development of the Illinois Certification Testing System are described. The degree of congruence between job analysis ratings provided by public school educators (PSEs) and teacher educators (TEs) who completed the job analysis surveys is examined. National Evaluation Systems, Inc., and the Illinois State Board of Education defined a preliminary content domain for each certification test field. Content advisory committees of PSEs and TEs reviewed these objectives to form two job analysis surveys--one for PSEs and one for TEs--sent to practicing PSEs and TEs from 55 colleges and universities. Surveys were sent to over 13,000 educators in 10 subject matter fields. Overall response rates were 82% for PSEs and 68% for TEs. Responses of PSEs were given primary emphasis in selecting objectives to be tested; responses of TEs were secondary information. PSEs and TEs tended to perceive the same content as important to an educator in a specific field. Music, math, and physical education--subjects in which the educator is more likely to use, than teach the content--showed the most difference between ratings from the two groups; and learning disabilities and general administration showed the least difference between the two groups. TEs' ratings of objectives consistently tended to be higher than those of PSEs, but both rated the objectives very high in importance. Four data tables are appended. (SLD)

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PUBLIC SCHOOL EDUCATOR AND TEACHER EDUCATOR JOB ANALYSIS
RATINGS OF CERTIFICATION TEST OBJECTIVES

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PUBLIC SCHOOL EDUCATOR AND TEACHER EDUCATOR JOB ANALYSIS RATINGS OF CERTIFICATION TEST OBJECTIVES

Introduction

Over 40 states are now using teacher certification tests as part of the licensing process of new, and in some states, veteran teachers. While there may be a variety of viewpoints on the merits of teacher certification testing, these tests are likely to continue to exist as long as they are viewed as an important component of the effort to promote educational quality within states.

From a psychometric perspective, one of the most important issues related to teacher certification testing concerns the degree to which the content assessed by these tests represents knowledge or skills that teachers need to know in order to perform their jobs in the classroom, in pupil personnel services positions, or in school administrative positions. It is incumbent upon test developers to demonstrate content validity or job-relatedness of each certification test developed. One of the primary tools for establishing content validity is through the use of job analyses. Job analysis surveys are useful for obtaining empirical evidence that the content knowledge assessed by each test is important to the job of educators in that field. The job analysis survey generally asks job-holders to indicate the importance of the content knowledge, as defined by the test objectives, to their job.

As supplementary information to use in defining the content of the tests, surveys can be conducted with teacher educators in the field to collect their opinions concerning the importance of the test objectives to the job of public school educators in the field. These surveys can provide information concerning the content knowledge that teacher educators think is most important for teacher candidates to know. This information is useful in determining the set of objectives to be measured on the tests. A secondary survey with teacher educators can also help to identify content that may need to receive more emphasis in the teacher education program.

This paper will describe job analysis procedures used in the development of the Illinois Certification Testing System, the teacher certification testing program that was developed through the cooperative efforts of the Illinois State Board of Education and National Evaluation Systems, Inc. For this program, surveys were conducted with both public school educators and teacher educators to collect information concerning the perceived importance of each of the test objectives to the job of an educator in the field. Following a description of the procedures, the paper will examine the degree of congruence between job analysis ratings provided by public school educators and teacher educators who completed job analysis surveys for selected fields.

Illinois Certification Testing System

In 1986, the Illinois State Board of Education (ISBE), as part of a legislative initiative to improve educational quality, contracted with National Evaluation Systems, Inc., (NES) of Amherst, Massachusetts to develop and administer 53 teacher, administrator, and pupil personnel service certification tests and a test of basic skills. Throughout the test development process, continuous efforts were made to involve Illinois public school educators and teacher educators in test domain and objective development, job analysis, item review, content validation, and standard setting activities.

Objective development. During the spring and summer of 1986, NES worked with Illinois public school educators, teacher educators, and curriculum coordinators from the ISBE to define the content domain for each certification test field. Using Illinois curriculum materials, textbooks, public school learning objectives and related materials, a preliminary content domain for each field was constructed. From these content domains, sets of topic outlines with potential test objectives were developed. The objectives for the Illinois Certification Testing System were designed to be measurable statements of the content knowledge and skills needed by educators in the field to perform their job. The objectives were fairly broad in the content knowledge that they covered. However, each objective was further broken down into discrete sub-objectives, or content limits, which facilitated more specific delineation of the content knowledge of an objective. After the first stage of objective development, there were approximately 40 to 60 objectives for each certification field.

Initial Illinois educator objective review. In September of 1986, Content Advisory Committees (CACs) for each certification test field were convened to review the initial set of objectives. Each CAC typically included six or seven public school educators and three or four faculty members from Illinois colleges and universities who prepared teachers for the certification field. Each CAC reviewed the set of objectives for their field. They were encouraged to revise objectives, delete objectives, add new objectives, or combine existing objectives as long as they ended up with 40 to 60 objectives that were distributed into four to seven subareas that reflected the major content areas for the field. At the end of this objective review meeting, each CAC had produced a set of objectives that specified the content knowledge needed by Illinois educators to perform their job effectively in Illinois public schools. These objectives were then ready to be submitted for validation by large numbers of Illinois educators in the form of a job analysis survey.

Job analysis survey form. Two job analysis survey forms were developed, one for public school educators and one for teacher education faculty. Both survey forms were highly similar in structure and format. The first section of the survey form requested educator demographic information, including teaching certification(s) held, level of education completed, credit hours completed in their certificate field(s), ethnic and racial background, years of professional experience, and for public school educators, grade level(s) at which they were currently working.

The second section of the survey form requested educators to rate the importance of all of the 40 to 60 content knowledge objectives for their field. As was noted earlier, these objectives had been previously reviewed, revised, and approved by committees of Illinois public school teachers and teacher educators. The actual wording of the importance rating stimulus for each test objective was as follows:

IMPORTANCE: Rate the importance of the content of this objective to the job of an educator IN THIS FIELD.

1. no importance
2. little importance
3. moderate importance
4. great importance
5. very great importance

In addition to the objective importance rating, public school educators also were asked to indicate the primary reason why they assigned a "no importance" rating to any objective. They also were asked to indicate the amount of time they spent teaching or using the content of each objective during the school year. Teacher educators were also asked to indicate if they expected students completing a teacher education program at their institution to know the content of each objective for the field they were rating.

Distribution of surveys. A total of over 13,000 educators were included in the job analysis surveys. Several steps were used in the identification and selection of job analysis survey participants. For public school educators, a data tape was provided by the ISBE. The data tape was derived from the ISBE Teacher Service Record, which listed all certified and practicing public school educators in each certification field. From this listing, a stratified random sample of educators was selected for the job analysis for each field. Survey materials were provided to school district superintendents, or building principals (Chicago only), who in turn distributed the materials to selected public school educators.

For teacher educators, a contact person at each of the 55 colleges and universities with approved teacher education programs provided a list of all faculty who were involved in teacher preparation, including those with college or department of education appointments and/or liberal arts faculty who were involved in teacher preparation. The total population of teacher educators was included in the survey. Job analysis materials were sent to the college contacts who distributed them to faculty. Both survey groups were provided with postage-paid envelopes to return their completed job analysis survey materials directly to NES. Follow-up mailings were sent to non-respondents one month after the initial job analysis survey distribution.

The overall response rate for the job analysis surveys was 82 percent for public school teachers and 68 percent for teacher educators (see Appendix A). During the analysis of data, responses to background questions were checked to ensure that only eligible respondents were included in the final analysis. In order to be included in the data for public school educators, individuals had to be teaching or working in the certification field in the current or previous year and had to hold a valid Illinois certificate in the appropriate field, or if employed in Chicago, had to have approval of the Chicago Board of Examiners. Teacher educators' responses were included in the data analysis only if the respondent indicated that he or she had taught undergraduate or graduate courses in the certification field in the current or previous year and that at least one of their courses was part of an approved teacher education program.

Use of Job Analysis Survey Results

The ratings given to each test objective by public school teachers and by teacher educators were tallied and summarized. The ratings provided by both groups were presented to the Illinois State Board of Education for use in selecting a subset of objectives for which test items would be developed and included on the first operational test forms. In selecting the subset of objectives to be tested, the ISBE based its decisions on the job analysis results and domain coverage. For instance, if two objectives rated as highly important covered very similar content, another job-related objective covering important content was selected in place of one of the two. Primary emphasis was placed on the ratings of public school educators; the ratings of teacher educators were considered as secondary information. The CACs confirmed the appropriateness of the objectives selected by the ISBE. The CACs were provided with three data sources to aid them in their deliberations: the public school educator job analysis ratings; the teacher educator job analysis ratings; and rankings of the objectives the CACs had provided earlier at objective review.

Examination of Objective Importance Ratings for Selected Fields

The following subject-matter fields were selected for specific study of objective importance ratings given by public school educators and teacher educators:

- Elementary
- Learning Disabilities
- Guidance
- General Administration
- History
- English
- Math
- General Science
- Music (K-12)
- Physical Education (K-12)

These fields were selected for two important reasons. First, they represent teacher certification fields with large populations in Illinois. Second, they represent a broad spectrum of disciplines including elementary education, special education, the humanities, sciences, pupil personnel services, and school administration.

The study of these selected fields was conducted in order to address the following four questions:

- (1) Did public school educators and teacher educators tend to rate the same objectives as most important?
- (2) Did the ratings of public school educators or teacher educators tend to be higher?
- (3) For what fields were public school educator and teacher educator ratings most different?
- (4) For what objectives were public school educator and teacher educator ratings most different?

Results

Did public school educators and teacher educators tend to rate the same objectives as most important? For each of the 10 selected fields a Pearson correlation coefficient of the mean objective importance ratings given by the two groups was computed to determine if the two groups tended to be consistent in their ratings regarding which objectives they considered most important and which they considered

least important. The resulting correlations ranged from .74 to .87 (see Appendix B) indicating consistency between the relative objective rankings of the two groups. Even for the field with the lowest correlation, General Administration, 54 percent of the variation in ratings for one group can be predicted by the ratings by the other group.

Did the ratings of public school educators or teacher educators tend to be higher? Mean importance ratings given by each group were calculated for each objective and the grand mean across all objectives was determined. For all 10 fields, the grand mean across all objectives was higher for teacher educators than for public school educators, indicating that for each field, teacher educators rated the entire set of objectives higher than the public school educators (see Appendix C). For public school teachers the grand mean of objective ratings ranged from 3.33 (on the five-point scale) to 4.18 for the 10 fields. For teacher educators, the range was from 3.68 to 4.30. The difference between the grand mean ratings for the two groups ranged from .12 for Learning Disabilities to .55 for Music (K-12).

The differences between ratings given to individual objectives by the two groups were also examined by computing z-tests. The z-tests compared the mean rating given to each objective by public school teachers and teacher educators. Differences that were at the .05 or lower level of significance were flagged, cognizant of the fact that by chance alone, five percent of the mean objective rating comparisons would be expected to differ significantly. For six fields, there were no objectives that were rated significantly higher by public school educators than by teacher educators; for three fields there was one objective so rated, and for one field there were two objectives (see Appendix D). On the other hand, there was a pattern that many objectives were rated significantly higher by teacher educators than by public school educators--from 24 percent to 83 percent across the 10 fields.

For what fields were public school educator and teacher educator ratings most different? Of the 10 fields examined, the fields that showed the most difference between ratings from the two groups were Music (K-12), Math, and Physical Education (K-12), in that order. For these three fields, between 79 percent and 83 percent of the objectives were rated significantly higher by teacher educators than by public school educators. On average, teacher educator ratings were between .40 and .55 points higher for each objective.

The two fields that showed the least difference between the two groups were Learning Disabilities and General Administration. For the field of Learning Disabilities only 24 percent of the objectives were rated significantly higher by teacher educators than public school educators, and the average objective rating for teacher educators was only .12 higher than for public school educators. For General Administration, 25 percent of the objectives were rated significantly higher by teacher educators, with the average objective being rated .16 of a point higher by that group.

For what objectives were public school educator and teacher educator ratings most different? Across the 10 fields, there were 11 objectives in five different fields with a difference in mean importance ratings between the two groups that was equal to or more than one point (on the five-point scale). Those objectives are presented on the following page.

Implications

Conducting a job analysis survey of public school educators is the most important component of the validation of teacher certification tests. Conducting a survey of teacher educators can provide supplementary information to be considered when determining the content to be included on a teacher certification tests.

This study, which compared ratings of importance for potential test objectives given by public school educators and teacher educators, indicated consistency between the importance ratings of the objectives provided by the two groups. This indicates that public school educators and teacher educators tend to perceive the same content as important to the job of an educator in that field and therefore, job-related.

Consistently across the 10 fields studied, it was found that teacher educator ratings of objectives tended to be higher than public school educators, however, both groups rated the objectives very high in importance.

Of the 10 fields studied, the fields in which there was the least difference between the importance ratings of public school educators and teacher educators were those in which the educator is more likely to use than teach the content--Learning Disabilities and General Administration. (The field of Guidance showed greater differences between ratings of the two groups but still less than the other seven fields.) Given the relatively small number of fields studied, it would be inappropriate to draw definitive conclusions about differences in ratings across fields, but this might be an area for further study.

An examination of particular objectives with substantial differences of ratings between the two groups seems to indicate that some of the objectives used less in day-to-day job-related activities may tend to be rated as more important by teacher educators than by public school educators. However, this does not appear to be the case for all objectives with substantially higher ratings from teacher educators.

Additional research on public school educator and teacher educator job analysis ratings for a greater number of fields would be valuable, in order to determine if the current results can be generalized. It would also be interesting to examine the degree of congruence among public school educators and teacher educators when the effects of demographic variables such as years of experience, level of education, and credit hours completed in certificate field are accounted for.

	<u>Mean Importance Rating</u>	
	<u>Public</u>	<u>Teacher</u>
	<u>School</u>	<u>Educators</u>
	<u>Educators</u>	<u>Educators</u>
<u>Elementary</u>		
Solve problems involving fractions, decimals, and percents.	3.5	4.5
Understand basic statistics.	2.4	3.4
Understand U.S. history (1800 to the present).	3.2	4.2
<u>Mathematics</u>		
Apply the properties of exponential and logarithmic functions.	3.1	4.1
Understand graphs of nonlinear functions and relations.	3.2	4.2
<u>General Science</u>		
Understand concepts and theories of evolution.	2.9	4.1
<u>Music (K-12)</u>		
Identify the historical period during which a given excerpt of Western art music was composed.	2.8	3.8
Understand chordal structure in a given score excerpt.	2.9	4.1
Understand harmonic function in a given score excerpt.	2.9	4.0
Identify types and characteristics of compositional forms.	2.7	3.8
<u>Physical Education (K-12)</u>		
Apply the principles of biomechanics.	3.0	4.0

APPENDIX A

Job Analysis Survey
Response Rates (Percentages) for Certification
Fields Included in Current Study

<u>Field</u>	<u>Public School Educators</u>		<u>Teacher Educators</u>	
	<u>Response Rates (%)</u>	<u>Number Analyzed</u>	<u>Response Rate (%)</u>	<u>Number Analyzed</u>
Elementary	83	211	79	102
Learning Disabilities	88	168	75	26
Guidance	91	160	72	51
General Administration	87	170	82	27
History	80	149	69	101
English	83	165	65	211
Mathematics	85	165	74	170
General Science	77	126	67	46
Music (K-12)	86	127	69	89
Physical Education (K-12)	77	142	75	75

*Response rate equals number of survey forms returned divided by number of survey forms sent.

APPENDIX B

CORRELATIONS BETWEEN PUBLIC SCHOOL EDUCATOR
AND TEACHER EDUCATOR RATINGS

<u>Field</u>	<u>r</u>	<u>R²</u>
Elementary	.77	.59
Learning Disabilities	.81	.65
Guidance	.80	.64
General Administration	.74	.54
History	.87	.76
English	.84	.70
Math	.83	.68
General Science	.79	.62
Music (K-12)	.84	.70
Physical Education (K-12)	.79	.63

APPENDIX C

MEAN IMPORTANCE RATINGS
(ON A FIVE-POINT SCALE)

<u>Field</u>	<u>Public School Educator</u>	<u>Teacher Educators</u>	<u>Difference</u>
Elementary	3.74	4.07	.32
Learning Disabilities	4.18	4.30	.12
Guidance	3.98	4.18	.20
General Administration	3.95	4.11	.16
History	3.63	3.90	.28
English	3.63	3.96	.33
Math	3.59	3.98	.40
General Science	3.33	3.68	.35
Music (K-12)	3.43	3.97	.55
Physical Education (K-12)	3.63	4.03	.40

APPENDIX D

NUMBER OF OBJECTIVES WITH SIGNIFICANTLY DIFFERENT PUBLIC SCHOOL EDUCATOR AND TEACHER EDUCATOR RATINGS

<u>Field</u>	<u>Number of Objectives</u>	<u>Objectives with Significantly Higher Public School Educator Ratings (%)*</u>		<u>Objectives with Significantly Higher Teacher Educator Ratings (%)*</u>	
Elementary	57	1	(2%)	30	(53%)
Learning Disabilities	42	2	(5%)	10	(24%)
Guidance	53	0	(0%)	22	(42%)
General Administration	40	0	(0%)	10	(25%)
History	56	0	(0%)	30	(54%)
English	46	0	(0%)	32	(70%)
Math	48	1	(2%)	39	(81%)
General Science	56	0	(0%)	27	(48%)
Music (K-12)	42	0	(0%)	35	(83%)
Physical Education (K-12)	48	1	(2%)	38	(79%)

*Significance is computed at the .05 level or below.

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